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GERMAN / ENGLISH TRANSLATION OF

PCT Patent Application WO 00/23923 A1

**Method for the Database-Assisted Selection of Products for
Electronic-Commerce Applications on the Internet**

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<p>(54) Title: METHOD FOR THE DATABASE-ASSISTED SELECTION OF PRODUCTS FOR ELECTRONIC-COMMERCE APPLICATIONS ON THE INTERNET</p> <p>(57) Abstract</p> <p>The aim of the invention is to allow clients to better compare products in electronic commerce applications. The invention is based on the access to a databank management system, wherein the user orders the selection of products by means of user interfaces. A list of products is set up after retrieval of data in the databank of the management system and conversion of an internal data structure which contains the products or objects of the databank. After products of the product list have been compared to criteria related to the desired product and predefined by the client in the form of a comparison function, the objects which have been selected by means of the comparison function are written in a result list and displayed to the client. The invention can be advantageously used in electronic commerce applications in Internet since it facilitates product search by the client.</p> <div data-bbox="829 1325 1419 1713"><pre>graph TD DB[DB] --> PL[PL] PL -- "f(w_i): w_i ∈ B_i · WV" --> EL[EL] EL -- "∩ EL : EL → ELF" --> ELF[ELF]</pre><p>DB: Externe Daten aus Datenbank EXTERNAL DATA FROM DATABANK</p><p>PL: Interne Repräsentation der Daten = Produktliste INTERNAL REPRESENTATION OF DATA - PRODUCT LIST</p><p>EL: Ergebnisliste (EL ⊆ DS) RESULT LIST</p><p>ELF: Ergebnislistenfeld RESULT LIST FIELD</p></div> <p>WV = Wertevorgabe VALUE SUPPLY B = Bedienschaltfläche USER INTERFACE I = (I, A)</p>		

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Method for the Database-Assisted Selection of Products for Electronic-Commerce Applications on the Internet

Description:

A relatively new way to offer and sell products is through the medium of the Internet through electronic-commerce applications.

E-commerce refers to the utilization of the technical means of electronic data networks to promote the economic and distribution processes of a company and to create new ways of distribution. The individual goals range from company communication to value-added processes on through the sales process in all phases of the market. The following areas of implementation apply to the e-commerce applications:

- on-line shopping, e.g., advertising, product information, interaction with customers/salespeople,
- customer service, e.g., technical documentation, installation and operating instructions, and
- Electronic Data Interchange (EDI), i.e., standardized data exchange between companies (including price catalogs, orders, invoices).

According to J. Krause (*Electronic Commerce: Geschäftsfelder der Zukunft heute nutzen* [*Electronic Commerce: Taking Advantage of Future Areas of Business Today*] [Hanser Verlag, 1998, ISB 3-446-19378-2]), the potential customer who has Internet access and wants to use an e-commerce application expects the following:

- a complete package, without fragments,
- comprehensive product information,
- clear statements as to price, warranty conditions, delivery conditions, and service, and
- confirmation of the order by e-mail and, and, in cases where the delivery will take longer, a corresponding notification.

In the following section, the e-commerce system of Deutsche Telekom AG (DTAG) will be described in greater detail as a well-known solution, which is similar to the e-commerce systems

of many other companies.

The foundation of DTAG's Internet-based e-commerce system www.T-Versand.de is the standard software *Intershop*. *Intershop* is a fully equipped medium that enables a smooth entry into the on-line market. The *Intershop* technology surpasses the typical boundaries of HTML pages and opens an individual shopping center. *Intershop* is the first standardized software in the world that makes it possible to create interactive, multi-media on-line shops. *Intershop* can easily be added to existing merchandise management or accounting systems or it can be run as an autonomous system, or both.

The *Intershop* software programs are tied to the Web server that supplies the HTML pages. *Intershop* has an integrated database that stores the product catalog data. On the server-side, e-commerce is provided primarily from three components:

- Web server
- e-commerce applications
- database with product catalog.

The customer has the following possibilities to open the home page of the T-Versand of the DTAG:

- direct entry of the address www.T-Versand.de in the browser,
- through the Internet site of the DTAG, and
- through Internet catalogs.

If the potential customer has access to the Internet, regardless of the technology, the customer can open the desired shop.

In practical terms, the customer enters a small department store, chooses the desired department from the start page, and arrives there with a few clicks of the mouse. The on-line shop begins with a choice of the product groups. In addition, the customer can read the general terms and conditions of business, use a dictionary, or go directly to the special offers. Customers can also register, i.e., they can introduce themselves to the system in order to start a later transaction

process. If the customer chooses "T-Net and Analog Terminals," for example, he will arrive at another choice between various configurations of this group. At this point, the customer will receive more detailed descriptions of what is offered in this category. This means that he will recognize whether he is on the correct path to his desired product or not.

In the left-hand menu bar, the customer has the opportunity at any time to change to another category.

If the customer selects the link "Wired^{TNI} Telephones," he will first receive the list of wired devices. This means that the customer arrives at a product list after his third selection already. This is an important basic principle that e-commerce shops should always adhere to. In the product list, the customer can see a picture, the name, the price, and a short description of the chosen telephone. If the customer chooses a telephone, he can have the product data sheet displayed to highlight its most important characteristics. Here the customer can review the characteristics and decide on a product. Afterward, the customer has the following options:

- place the telephone in the shopping cart,
- go back to the product list,
- follow cross references (e.g., accessories).

If the customer decides to put the telephone in his shopping cart, the shopping cart will hold the products until the customer has finally decided to finish his order. The shopping cart offers the following functionalities:

- placing products in the cart (with their quantity),
- deleting products from the shopping cart,
- showing the order amount,
- displaying the delivery conditions, and
- ordering the products in the shopping cart.

In most cases, the customer will either buy a product, find more information about products and then buy, or only inform himself about the products. A customer who wants to buy a product

^{TNI} **Translator's Note:** the German term translates correctly as "wired" but what is probably meant in this case are "(land)line-based telephones" as opposed to cellular phones that are not plugged into a phone jacket in the wall.

and already knows his destination and typically his desired product as well can make purchases without problems with the system described above. The undecided customers or those who are seeking information will have more difficulties. They will have to change the pages often in order to inform themselves about the differences among the products offered. This is because products can only be compared directly with one another through the values of the product data pages. The current system does offer the presentation of the DTAG catalog on the Internet with a complete sales transaction, but there is still not enough support for the customers in their search for the products that are right for them. This is especially because the product lists, due to their length, are ill-designed for a search. Similar products that are described only by a brief text and a single picture can often not be distinguished from one another. In order to compare product characteristics with one another, the customer must continually display the corresponding product data page and remember or make a note of the most important characteristics. Only after this can he return to the product list and view another product or product data page to compare this with the first product. This procedure places high expectations on the customer and is very time-consuming. Especially if there are high on-line costs, the customer will think twice about whether this endeavor is justified since the print catalog contains the same information content. It is even more difficult to compare products that are contained in different categories. The procedure is similar to that described above, but it includes an additional switch between categories. An example for this is the comparison between D-net telephones and C-net telephones. If a customer does not have a certain basic knowledge or has not collected information about certain products, he will be overwhelmed by the product information on the product data page. In particular, he will not see the most important characteristics of the products at one glance. A further weakness is that there are very few support options made available to the customer to solve his problems.

On the basis of this state of the art, this invention is based on the objective to develop a process for the customized selection of products from a product catalog on the Internet in which the entire selection (product list) and the complete product information is retained and the above-mentioned weaknesses are eliminated. The invention will offer the customer a better and faster option for comparing products.

This objective is realized by means of a method according to Claims 1.

Known e-commerce applications are based on a database in which the products from the catalog

to be represented are managed and maintained.

However, the medium Internet offers the possibility of providing much more effective product presentations for the customer from the databases than are now possible with the known e-commerce applications in which relevant information - e.g., the current price - is retrieved from the database and provided only when the product is called up.

The method according to the invention, which will be referred to hereafter as *Produktfinder* [*Product Finder*], is also based on a product catalog. The difference to known e-commerce applications is based on the fact that there is no link to a group of products, but rather that with the help of previously defined parameters entered by the customer during his on-line access, a selection of certain products will follow.

The *Product Finder* consists of static components, which do not change or always run in the same way, and of dynamic components, which always fit into the parameters that, for example, were set earlier by an administrator of the *Product Finder*. These parameters ensure that the right components are set up in the interface^{TN2} of the *Product Finder* so that the correct data will be retrieved from the database and that the continued processing of the data will be carried out correctly, again with the interaction of the user.

Components of a universally applicable *Product Finder* are:

- database manager,
- product lists,
- amount of user interfaces,
- result lists,
- program control, and
- parameter lists.

The first five components have not only static but also dynamic properties. On the other hand, the new component "parameter lists," is used by all the other components to initialize the *Product Finder*.

^{TN2} Translator's Note: the source patent uses the German term for "surface" in this case, and without more context it is impossible to know if that refers to the "interface" of the Product Finder or some "level" in the hierarchy of the Product Finder.

The most important details for a parameter of the parameter list are:

- table name,
- attribute name,
- type of user interface,
- user interface label
- initial value of the user interface, and
- comparison operator.

It is helpful to introduce further parameters to design the *Product Finder* in a universally applicable manner. These parameters could be, for example:

- path of the database,
- path of the product pictures,
- colors in the *Product Finder*, and
- font in the *Product Finder*.

Table name and attribute name are relevant for the database to retrieve the correct data for the internal data structure.

Type of user interface, user interface label, and initial value of the user interface are important for the graphic user interface and for the processing of the data from their domain of values.

Through interactive selection, the comparison operator connects a value from the value supply of the user interface with attributes from the internal data structure in order to compare these and to ascertain the appropriate objects.

There could also be other settings included in the parameter lists, such as the path of the graphics, the path of the database, and other settings that would make sense for the environment of the *Product Finder*. These details enable the *Product Finder* to easily adjust to new fields of application.

The following static program elements constitute the basis of the *Product Finder*:

- overall control program,
- function to display pictures, and
- toolbar.

It is also beneficial to statically link certain user interfaces to products (e.g., price of the product). Further, it makes sense to always carry out database accesses that occur with every initialization and processing within the *Product Finder*. The graphic user interface of the *Product Finder* consists of four components:

- field for result lists,
- picture shown,
- toolbar, and
- groupings of user interfaces.

There can be any number of such groupings created that can in turn contain any number of user interfaces.

The method for the database-assisted selection of products for electronic-commerce applications on the Internet is based on the access to a database management system in which the user can direct the selection of products with the help of user interfaces. The method consists of several process steps as shown in Figure 1.

In the first process step, data are read from the database management system after the start of the system and converted into an internal data structure (a product of the *Product Finder*). A product list is created from the instances of the data structure "product".

In the second process step, the objects of the product list are reviewed with a comparison function to see if they are valid. The valid objects are copied into a result list (list of valid objects). The comparison function is activated through initiating the *Product Finder* or through the user changing a user interface. With a change in status of a user interface, the validity of the objects of the product list will be verified according to a comparison function compiled of the user's/customer's wishes. The comparison function is composed of the selected values of the user interfaces, the corresponding attribute values of an object on the product list, and a comparison operator per chosen value of the user interface.

In a third process step, the valid objects determined by the comparison function are entered into a result list.

In a fourth process step, the result list is displayed to the user in a result list field. The user can make a choice based on the objects in the result list field.

Every step of the process will be explained below in more detail. First, the execution of the individual process steps will be described. This is followed by an explanation as to which parameters are set up by the administrator. The data of the database will be identified by its table names and attribute names. In the *Product Finder*, the data are assigned to variables and formats. When a database is queried for tables and attributes, the result is a data record list. In order to save all of the products in the *Product Finder*, a similar data record list must be present in the data structure of the *Product Finder*. To implement that condition in the *Product Finder*, every attribute of the database that is accessed in the *Product Finder* will have a variable in the data structure of the *Product Finder*. The result is that for all of the attributes in the database, a corresponding range of variables is defined that represent a specific product or class of products. In order to include all of the products in the *Product Finder*, every product is configured as an object of a list. This data list will subsequently be called a product list. In the following table, the attributes from the database will be juxtaposed to the corresponding variable of the *Product Finder*. A range of variables will be referred to as an array.

In order to fill the internal data structure, an SQL statement must be created for each table and attribute combination that will access the database and transfer the data to the product list. The data that will always be necessary in the data structure of the *Product Finder* can be handled with a static SQL statement and be transferred to the data structure "product". To create truly dynamic SQL statements, an administrator should first determine the amount of table names and the corresponding attributes. The number of tables or attributes will also determine the attribute amount of an object of the product list. Figure 2 demonstrates how two dynamic SQL statements and one static SQL statement are handled and the corresponding attributes of the product list are filled. A user interface is characterized by the label, the type of user interface, and the value supply. The label field determines the text that will show a later user of the *Product Finder* which characteristics he can implement with that user interface. The type determines the kind of

user interface, e.g., check box or option button. The value supply is the amount of values that can be set up in the user interface, in which case these can be numbers, characters, or true/false values. To build up the user interfaces in the *Product Finder*, the administrator must enter the type and the label field. The value supply of the user interfaces originates from the attribute values of the product list. To receive the correct attribute values from the product list, a projection to the corresponding objects of the product list is included.

In summary, it can be stated that filling up the value supply is always defined by the user interfaces and the corresponding values of an object on the product list. The previously defined parameters (table name/attribute name of the database of the administrator), in case of an expansion through the type and label field of the user interface, simultaneously also determine the origin of the value supply.

An example is shown in Figure 3 in which the value supply of the user interfaces is filled with two dynamic attributes and one static attribute for each object of the product list. In the next step, a result list is created from the product list. Three components are designated to complete the result list:

- specific attributes of the product,
- a selected value from the value supply of a user interface, and
- a pre-determined type of linkage.

If a value of an attribute of an object from the product list that was determined by a projection and that is linked with the value from the value supply of the user interface results in a valid value, then the entire object from which the attribute came is valid and can be carried over into the result list, if the other attributes with their types of linkage also produce valid values.

The process of the interactive selection is clarified through an example in Figure 4. In the example, the system or the user sets the value W2 from the value supply on the user interface B2. This value is linked to attribute Att. 2 with the help of the comparison operator 2 and tested for validity. When this validity is established along with all other validities, then precisely this object is copied into the result list. This happens the same way with all other objects of the product list.

The values of all valid objects are now in the result list. After the result list has been created, the result list field is made visible to the user. The result list field is a projection from the result list, i.e., only certain attribute values of every object from the result list will be transferred over into the result list field. With most *Product Finders*, it makes sense to make the name and the color of the products available to the user.

There are two principle alternatives for the integration of the *Product Finder* into the Internet: The *Product Finder* runs on the server page and only entries/results from/to customers are transmitted. The second possibility is to download the *Product Finder* as a program onto the computer or the browser of the customer.

The first option can be solved with the help of CGI programming. The customer is sent an HTML form from the server. The customer enters his selections into the user preferences form. The results of the selection are sent to a CGI script on the server side through a "transfer" button. This uses the selections to choose the right products from the database of the database management system and to send the results back to the customers as an HTML form.

An advantage of this method is that the form is very small and can be transferred very quickly to the customer. A further advantage is that a database query on a high-performing server happens very fast. The transmission of the results through an HTML page is also not time-critical. A disadvantage of this method can be seen in the fact that the customer must press the "transfer" button with each variation of his selections and therefore must continually reinitiate his server connection. Such a server connection slows down the retrieval of the desired results for the customer.

For the second alternative, in which the *Product Finder* runs on the client side, there are two implementation options.

The first option is based on a script that runs on the client such as Java Script or Visual Basic Script.

The second possibility for the implementation of *Product Finder* on the client side lies in programs that are integrated in the HTML pages that will be transmitted. Such programs include

Java Applets or ActiveX components. An advantage of this variation is that immediate interactivity with the customer is possible. This means that the customer can make selections that will immediately be processed and whose results will be made available without any time lapse.

The method according to the invention can be beneficially applied in the case of e-commerce applications on the Internet because it simplifies the customer's product search.

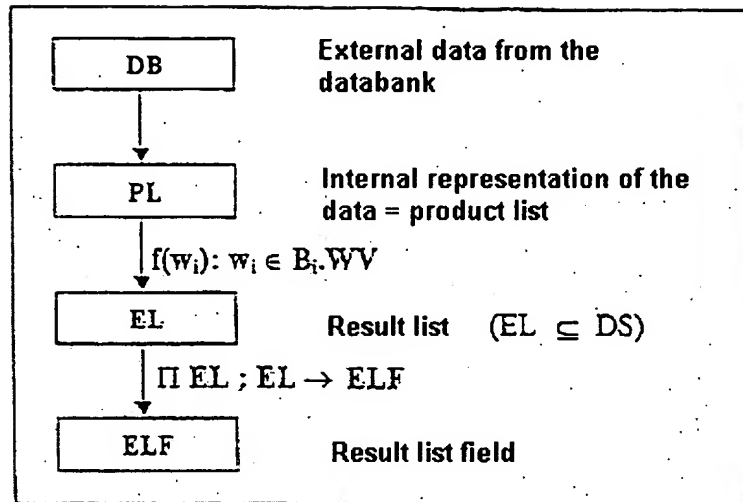
Method for the Database-Assisted Selection of Products for Electronic-Commerce Applications on the Internet

(1) Claim

1. A method for the database-assisted selection of products for electronic-commerce applications on the Internet with access to a database management system with which the user manages the selection of products with the help of user interfaces,

characterized by the following steps:

- retrieval of data from the database of the database management system after the start of the system, conversion of an internal data structure that contains the products of the database, and creation of a product list,
- verification of the validity of the objects of the product list in the case of a status change of a user interface by means on a comparison function based on the wishes of the customer; with said comparison function being composed of selected values of the user interface, the corresponding attribute values of an object from the product list, and a comparison operator for each selected value of a user interface,
- entry of the valid object into a result list,
- display of the result list in a result list field, which is then displayed to the user.



WV = Value supply

Ξ = User interface

$i = \{1, 2\}$

Fig. 1

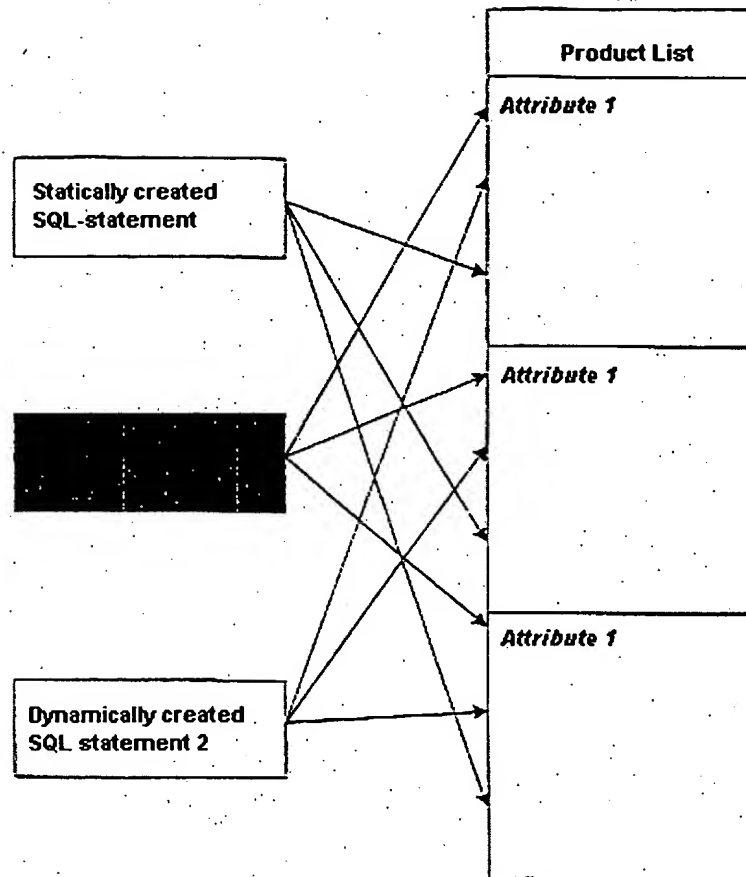


Fig. 2

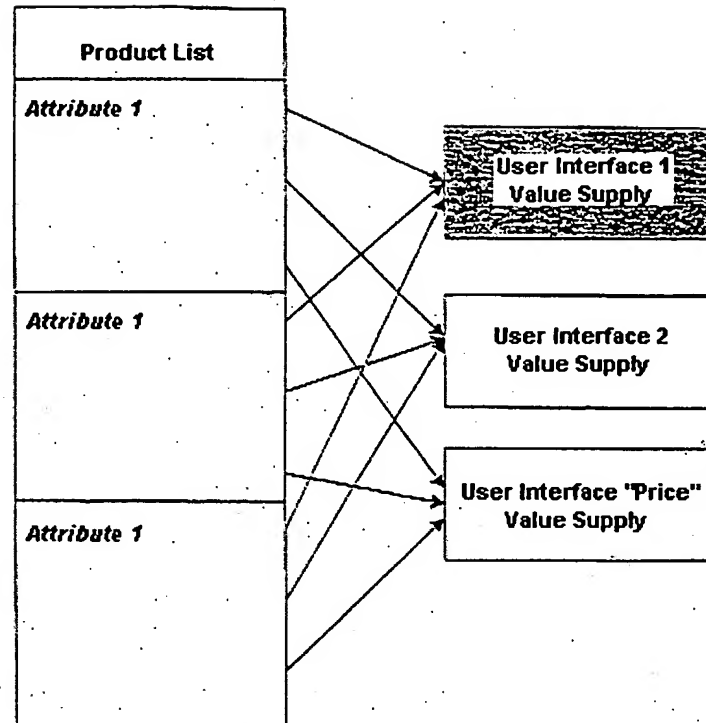


Fig. 3

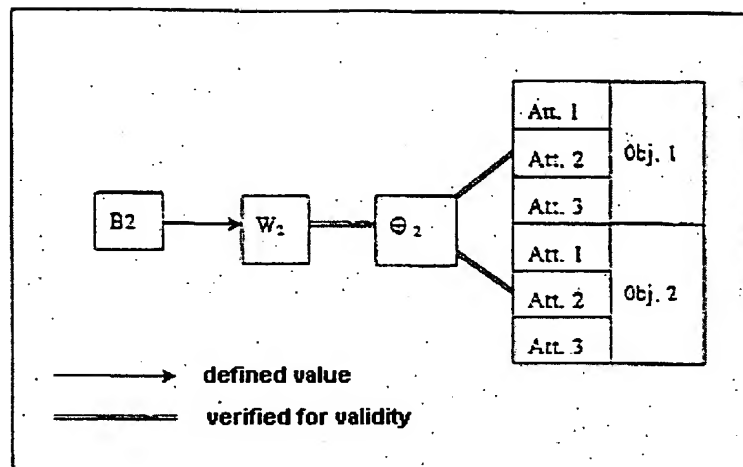


Fig. 4

INTERNATIONAL SEARCH REPORT

Int. nat. Application No.
PCT/EP 99/07246

A. CLASSIFICATION OF SUBJECT MATTER IPC 7 G06F17/60 G06F17/30		
According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELDS SEARCHED Minimum documentation searched (classification system followed by classification symbols) IPC 7 G06F		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
Electronic data base consulted during the international search (name of data base and, where practical, search terms used)		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	EP 0 855 687 A (AT & T CORP) 29 July 1998 (1998-07-29) abstract; figures 9-13 ---	1
Y	"INTERNET ACCESS TO DATABASES WITH USER-DEFINED FIELDS" IBM TECHNICAL DISCLOSURE BULLETIN, US, IBM CORP., NEW YORK, vol. 40, no. 10, 1 October 1997 (1997-10-01), pages 133-134, XP000739452 ISSN: 0018-8689 the whole document ---	1
A	EP 0 807 891 A (SUN MICROSYSTEMS INC) 19 November 1997 (1997-11-19) abstract; figure 4 --- -/--	1
<input checked="" type="checkbox"/> Further documents are listed in the continuation of box C. <input checked="" type="checkbox"/> Patent family members are listed in annex.		
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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5 737 592 A (SRINIVASAN VENKATACHARY ET AL) 7 April 1998 (1998-04-07) abstract; figures 2,3 column 1, line 5 - line 57	1
P,A	WO 98 57277 A (SCIENTIFIC ATLANTA) 17 December 1998 (1998-12-17) abstract; figure 10	1

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/EP 99/07246

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